CONTACT: Anne Price, PR Works, Inc.
            602-330-6495
            pr@pwg.org

IEEE-ISTO Printer Working Group (PWG) Announces Updated Internet Printing Protocol (IPP) Extensions to Support Additive Manufacturing/3D Printing and a Specification for Safe G-Code that Avoids 3D Printing Commands with Safety or Security concerns

PISCATAWAY, N.J., July 16, 2020 – The IEEE-ISTO Printer Working Group (PWG) has released IPP 3D Printing Extensions v1.1 (PWG 5100.21-2019) and PWG Safe G-Code Subset for 3D Printing v1.0 Best Practices (PWG 5199.7-2019).

These documents build on previously defined extensions to the Internet Printing Protocol (IPP) Internet Standard (IETF STD92) that combine existing high-level 3D file formats with the IPP network printing protocol and Job Ticket formats to describe the printer's capabilities, the objects to print, and the status of submitted jobs to better and more portably produce physical objects with additive manufacturing devices, also known as 3D printers.

The IPP 3D Printing Extensions specification v1.1 (PWG 5100.21-2019) extends IPP for 3D printing with a focus on popular Fused Deposition Modeling (FDM) devices that melt and extrude filaments of ABS, PLA, or other materials in layers to produce a physical 3D object. These IPP extensions can be used for other printing methods such as selective laser sintering (SLS) and stereolithography (SLA), as well as many other materials, such as concrete printing.

The v1.1 update clarifies that the requirements for implementing the 3MF file format are limited to those printers that do on-board slicing, adds attributes describing the build platform shape, nozzle and chamber environment, describes how to use the IPP Shared Infrastructure Extensions [PWG5100.18] with 3D printing, and defines a structured naming convention for the "material-type" attribute for values that aren't registered with the PWG. This last addition is very important because it provides IPP with an extensible convention for specifying material identifiers from the wide variety of other standard and non-standard material identifiers.

The new PWG Safe G-Code Subset for 3D Printing v1.0 Best Practices document (PWG 5199.7-2019) defines a "safe" subset of G-code for use in 3D printing with IPP along with the

capabilities and parameters needed to allow a client to generate G-code compatible with the printer. PWG Safe G-Code eliminates direct device control (e.g., "set extruder temperature") and hardware access (e.g., "write file to SD card)" commands that pose serious safety and security concerns.

The PWG invites participation (open as always to members and non-members) from anyone in the 3D printing/additive manufacturing community. Non-members are always welcome to participate in PWG standardization efforts. Sample code implementing the IPP 3D Printing Extensions specification v1.1 has been published in the PWG's IPP Sample Code project on GitHub (https://github.com/istopwg/ippsample). More info can be found on the PWG 3D Printing page: https://www.pwg.org/3d/.

About the PWG
The IEEE ISTO Printer Working Group (PWG) is a Program of the IEEE Industry Standard and Technology Organization (ISTO) with members including printer and multi-function device manufacturers, print server developers, operating system providers, print management application developers, and industry experts. Originally founded in 1991 as the Network Printing Alliance, the PWG is chartered to make printers, multi-function devices, and the applications and operating systems supporting them work together better. The PWG enjoys an open standards development process. More information is available at https://www.pwg.org.

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Social media: Printer Working Group #PWG @IEEEISTO updates #IPP specifications to standardize additive manufacturing & 3D printing and provides safe subset of G-code to address safety and security concerns www.pwg.org. Sample code https://bit.ly/PWGcode